CLAIMS

What is claimed is:

1. A boost DC-DC converter, comprising:

an integrated magnetic core having (i) a three-legged flux-conducting element, at least one of the legs being an energy-storage leg, (ii) two primary windings each disposed on a respective leg of the flux-conducting element, the primary windings being coupled in parallel to a first input terminal of the converter, and (iii) two series-connected secondary windings disposed on the flux-conducting element;

secondary-side rectification and filtering circuitry connected across the secondary windings;

a pair of primary-side switches each coupled in series between a second input terminal of the converter and a respective one of the primary windings; and

control circuitry operative to generate control signals for the primary-side switches so as to obtain a desired boost-mode output voltage of the converter.

2. A boost DC-DC converter according to claim 1, wherein the energy-storage leg is a middle leg, and each secondary winding is disposed on a respective outer leg of the flux-conducting element.

3. A boost DC-DC converter according to claim 2, wherein the middle leg has an energy-storing gap.

4. A boost DC-DC converter according to claim 2, wherein the middle leg has an energy-storing section of high-permeance material.

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5. A boost DC-DC converter according to claim 2, further comprising an inductor winding on the center leg, the inductor winding being connected in series between the first input terminal of the converter and the parallel primary windings.

6. A boost DC-DC converter according to claim 1, wherein two outer legs of the flux-conducting element are energy-storage legs, and wherein the secondary windings are disposed on a middle leg of the flux-conducting element.

7. A boost DC-DC converter according to claim 6, wherein each of the outer legs has an energy-storing gap.

8. A boost DC-DC converter according to claim 6, wherein one output terminal of the converter is coupled to a center tap of the series-connected secondary windings.

9. A boost DC-DC converter according to claim 1, wherein the integrated magnetic core further includes an additional secondary-side winding coupled to the rectification and filtering circuitry, the additional secondary-side winding and the control circuitry being operative to provide for operation of the converter when the output voltage of the converter is less than a predetermined minimum output voltage.

10. A boost DC-DC converter according to claim 9, wherein the additional secondary-side winding is a single winding disposed on the middle leg of the flux-conducting element of the integrated magnetic core.

11. A boost DC-DC converter according to claim 9, wherein the additional secondary-side winding is one of two windings disposed

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on respective outer legs of the flux-conducting element of the integrated magnetic core.

12. A boost DC-DC converter according to claim 11, wherein the additional secondary-side winding and the control circuitry are operative to provide for flyback operation of the converter when the output voltage of the converter is less than the predetermined minimum output voltage.

13. A boost DC-DC converter according to claim 1, wherein the rectification and filtering circuitry has a full-wave rectification topology.

14. A boost DC-DC converter according to claim 1, wherein the rectification and filtering circuitry has a full-bridge rectification topology.

15. A boost DC-DC converter according to claim 1, wherein the rectification and filtering circuitry has a voltage doubler rectification topology.

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